SERVICE DATA
FILE NO. 170-168

TOSHIBA

STEREO POWER AMPLIFIER

SC-A90F

SPECIFICATIONS

■ General

Power Supply:	220V ∿, 50 Hz for Europe or 240V ∿, 50 Hz for the United Kingdom and Australia
Power Consumption:	580W
Weight:	15 kg
Dimensions:	420(W) x 142(H) x 325(D) mm

■ Meters

Indication Range:	0.001W to 200W −50 to +3 dB

■ Amplifier

Continuous Power Output:	100W per channel, at 8 ohms, from 20 Hz to 20 kHz (for the United Kingdom and Australia) 100W per channel, at 4 ohms, from 20 Hz to 20 kHz (for Europe)
Total Harmonic Distortion:	0.012%
Frequency Response:	0 Hz to 100 kHz, +0 dB, −2 dB
Power Bandwidth (IHF):	5 Hz to 100 kHz (8 ohms, 0.2% THD)
Damping Factor:	150 (1 kHz, 8 ohms)
Load Impedance:	8 ohms to 16 ohms (for the United Kingdom and Australia 4 ohms to 16 ohms (for Europe)
S/N Ratio:	−125 dB (IHF-A)
Input Sensitivity and Impedance:	1V (at rated power, 8 ohms)

Specifications are subject to change without notice.

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PRINTED IN JAPAN 22906177 March, 1983 (S)

1. OPERATING CONTROLS

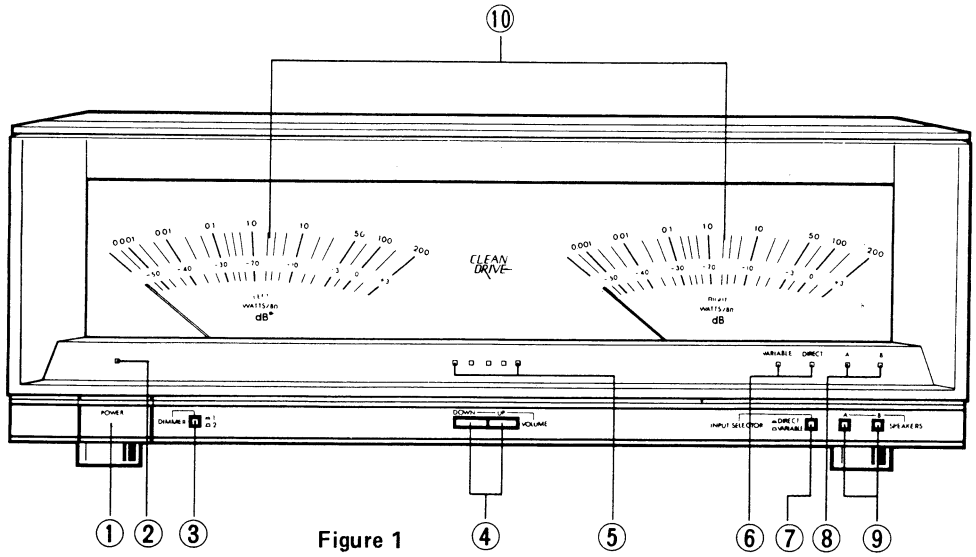

Figure 1

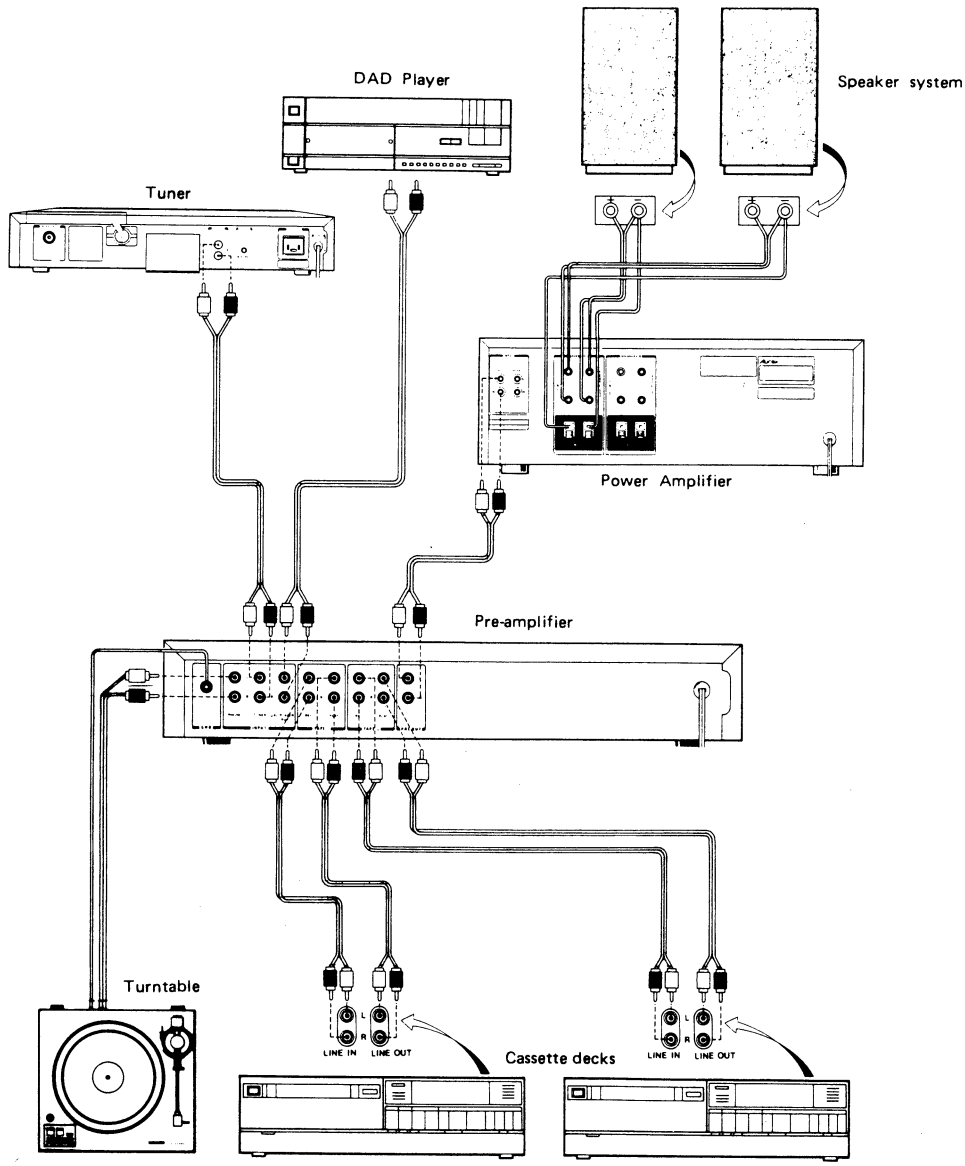

Figure 2

FRONT PANEL FACILITIES

① **Power switch**
Depress this switch to turn power on and depress again to turn power off. The power indicator lights to show when power is on.

② **Power indicator**
When power is turned on, this lamp flashes on and off green and after 6 to 9 seconds it changes to solid green. While this lamp is flashing on and off, the muting circuit is operating so no sound will be heard.

③ **Dimmer switch**
This switch raises and lowers the power meter illumination. Illumination is low when the switch is in the OUT position (⊐) and bright when the switch is in the IN position (⊏).

④ **Volume buttons**
Use these buttons to control the volume of the component connected to the VARIABLE input terminals on the rear panel. Hold the UP or DOWN button down until the desired volume level is obtained.

⑤ **Volume level indicator**
Higher volume settings are shown by an increasingly larger number of lamps lighting up.

⑥ **Input indicators**
Lights to show the setting of the input selector.

⑦ **Input selector**
Set to the IN position (⊏) to listen to the component connected to the DIRECT input terminals and the OUT position (⊐) to listen to the component connected to the VARIABLE input terminals.

⑧ **Speaker indicators**
Light to show which pair of speakers is being used.

⑨ **Speaker selectors**
Press selector A to use the speakers connected to the SPEAKERS A terminals and selector B to use the speakers connected to the SPEAKERS B terminals. When both selectors are pressed, sound will come from both speaker systems but the Clean Drive system will not operate.

⑩ **Peak power meters**
These meters show the power output in each channel. The meters can be read directly when speakers rated at 8 ohms are used. For 4 ohm speakers, the readings should be halved and for 16 ohm speakers, the readings should be doubled to obtain the actual output power.

OPERATION

Note: Do not plug in this unit to a wall socket or turn on the power switch until all connections have been properly completed.

■ **Speaker Connections**
Connect the right speaker cable to the "R" speaker terminals and the left speaker to the "L" terminals on the rear panel of this unit. Make sure the positive (+) cable is connected to the (+) terminal and the negative (–) and clean drive cables to the (–) terminal. Crossing these cables will cause loss of stereo reproduction.

- For speakers with cables that can not be disconnected, refer to page 4 for directions on connecting the clean drive cables.
- Be absolutely certain that the amplifier power switch is off when making speaker connections.
- Be careful not to short-circuit the positive and negative speaker connections.

■ **Connections to the DIRECT Terminals**
Connect the OUTPUT terminals of a pre-amplifier to the rear panel DIRECT terminals using pin cables. When using only the pre-amplification section of an integrated amp with this unit, connect the PRE-OUT terminals to the rear panel DIRECT terminals.

■ **Connections to the VARIABLE Terminals**
This unit also has variable input terminals which are linked to the front panel volume buttons. These terminals should be used with digital audio disc players and other similar components. It is also useful for adjusting level when using a multi-amp system.

■ **Amplifier and Speaker Precautions**
This unit has a power muting circuit to eliminate the loud noises generated when power is turned on and a speaker protection circuit that cuts off output to the speakers when a DC voltage appears at the speaker outputs. If the speaker protection circuit is activated, no sound will be heard and the power indicator ② will flash on and off. In this case, turn off the power and check for short circuits in the speaker connections. After you have searched for and corrected any problems, turn the power on again. If the protection circuit operates again, turn the power off, disconnect the input pin cables and turn the power back on. If the power indicator ② stops flashing on and off this time, the problem is located in the pre-amplifier or other component connected to this unit. If the power indicator continues to flash on and off, contact your Aurex dealer for assistance. In no case should you remove the cabinet of this unit and touch internal parts yourself. An additional protection circuit operates if the internal temperature rises too high and, again, no sound will be heard and the power indicator will flash on and off. If this occurs, turn the power off, wait for the set to cool down and then turn power on again.

CAUTION

- If this unit is not properly located, the temperature of the top panel can reach 60°C or more. In this case, the color of the thermal label will begin to change, so be sure to check it from time to time.
- This unit generates a large amount of heat. It should always be used in a well ventilated area and have at least 10 cm of open space on all sides. Be sure that the ventilation openings are never blocked. Also check the thermal label from time to time to confirm that the temperature is not too high.

CLEAN DRIVE

■ **Clean Drive**

The role of an audio amplifier is to faithfully amplify the incoming signal and feed the amplified signal into the loudspeakers. Distortion is the amount by which the amplifier alters the incoming signal. The standard distortion value quoted for amplifiers is measured when a non-inductive, purely ohmic resistance is connected as the load. This value becomes one order of magnitude higher if distortion is measured at the speaker input terminals in an actual-use situation. That means the amplifier is not doing its job of simply amplifying the signal without adding its own coloration.
The Clean Drive system was developed with the purpose of allowing the amplifier to do its job as nearly perfectly as possible. Furthermore, clean drive not only assures faithful signal amplification, it also drives the speakers with that same unaltered signal.

- **The Principle of Clean Drive**

As can be seen in the diagram, sensor cords are connected to each speaker's (–) terminal. The Clean Drive system detects spurious signals generated by the speakers and feeds them back to the amplifier where they are cancelled out. Since the amplifier is now free of this source of distortion, its full capabilities can be used to drive the speakers without adding anything spurious to the amplified signal. (Fig. 1)

- **The Benefits of Clean Drive**

The Clean Drive system improves sound quality in the following ways:

1. Harmonic distortion at the speaker terminal is less than one tenth that of previous systems.
2. Intermodulation distortion is significantly reduced.
3. Frequency response is virtually flat.
4. Optimum performance can be obtained with no adjustments regardless of the type of speakers and speaker cords.
5. The influence of speaker cords on sound quality is eliminated.

* When using the clean drive system with speakers with no terminals use the two accessory Clean Drive connectors to connect the speakers to the amplifier. (Fig. 2)

(1) Right speaker unit:

1. Cut the speaker cord as far from the amplifier as possible leaving enough to connect the clean drive connector to the speaker. Peel back a little of the sheath to expose the bare wire on both cut ends.
2. Connect the speaker (+) and (−) cords to the respective (+) and (−) terminals on the clean drive connector ((a) and (b)).
3. Connect the right clean drive terminal (using the clean drive cord) and Speaker A right channel (−) terminal (using the speaker cord) of the SC-A90F to terminal(d).
4. Connect the Speaker A right channel + terminal on the SC-A90F to terminal (c).

(2) Connect the left speaker unit in the same manner.

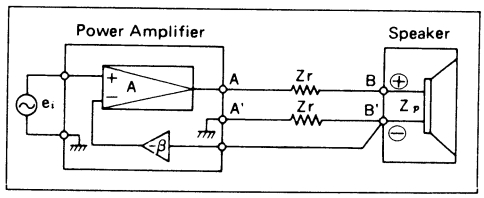

Figure 3

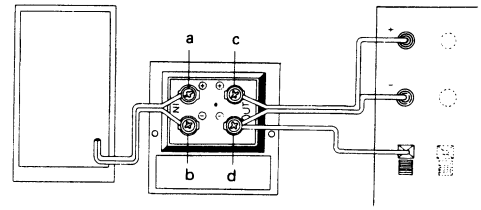

Figure 4

2. BLOCK DIAGRAM

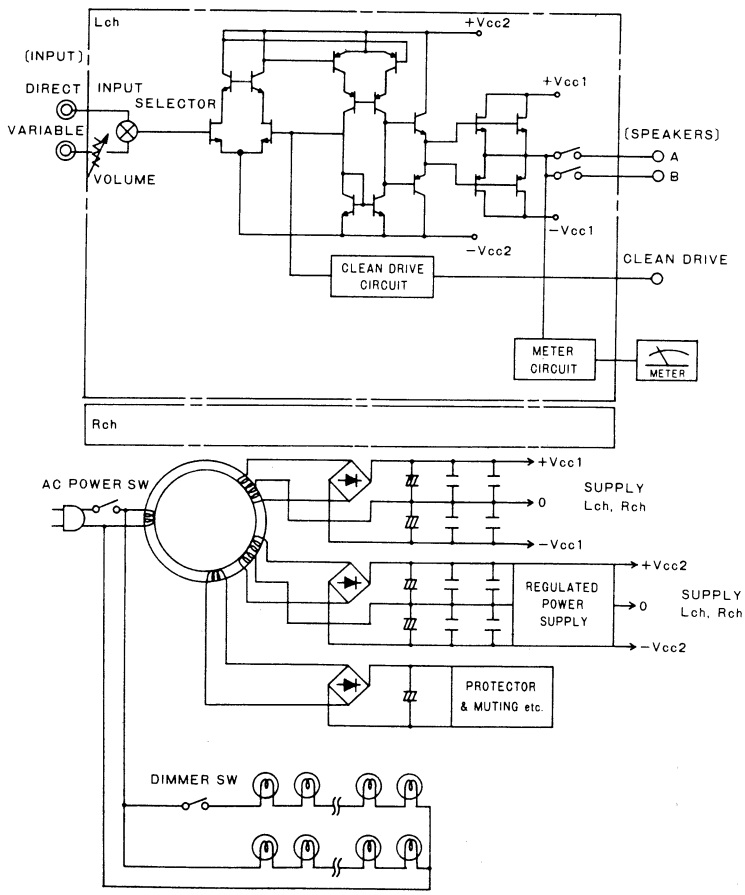

Figure 5

3. DISASSEMBLY INSTRUCTIONS

TOP COVER REMOVAL

1. Remove eight screws Ⓐ (3ϕ x 10mm), Ⓑ and Ⓒ (4ϕ x 8mm), then the top cover can be removed from the unit.

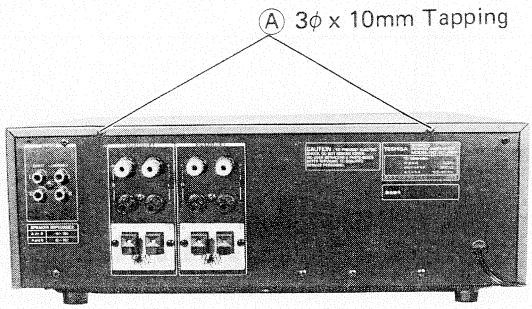

Figure 6

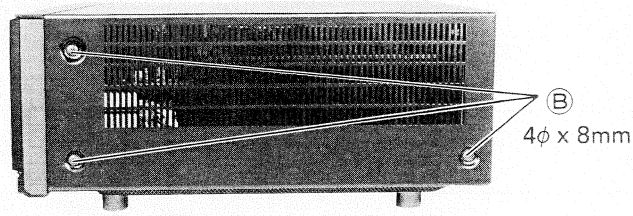

Figure 7

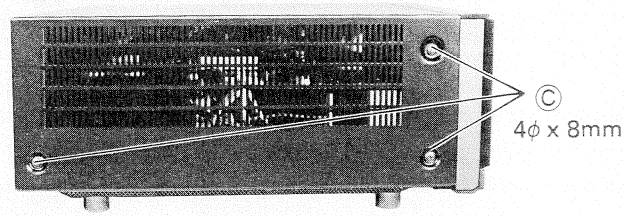

Figure 8

BOTTOM PLATE REMOVAL

1. Remove five screws Ⓓ (3ϕ x 6mm), then the bottom plate can be removed from the unit.

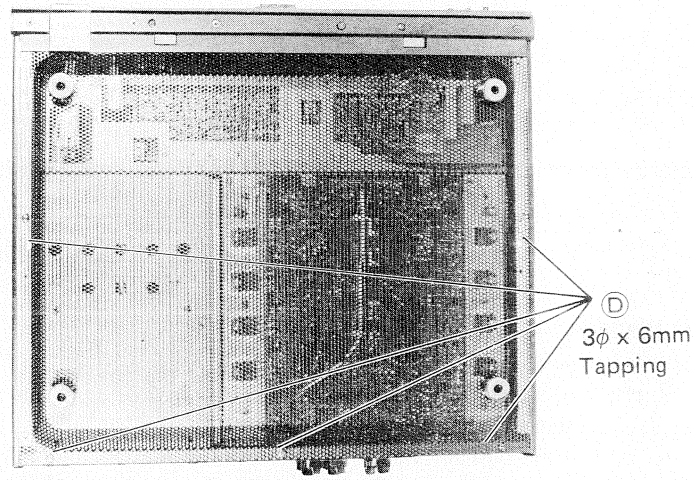

Figure 9

FRONT PANEL ASSEMBLY REMOVAL

1. Remove four screws Ⓔ and Ⓕ (3ϕ x 6mm), and disconnect connector Ⓖ, then the front panel ass'y can be removed from the unit. (Be carefull with the other connectors of the lead wires.)

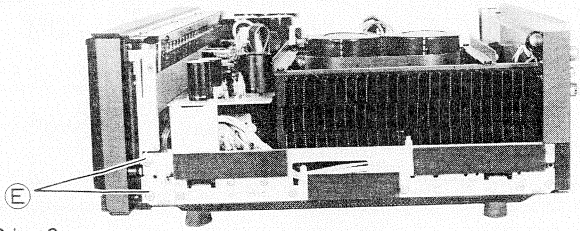

Figure 10

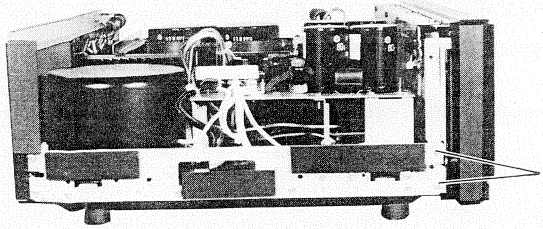

Figure 11

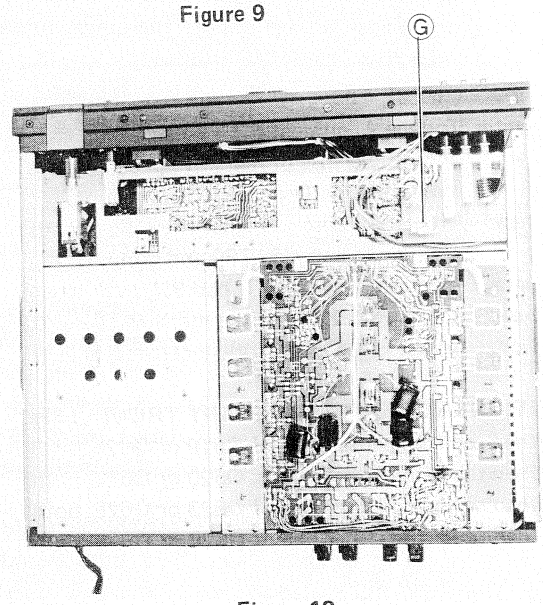

Figure 12

4. ADJUSTMENTS

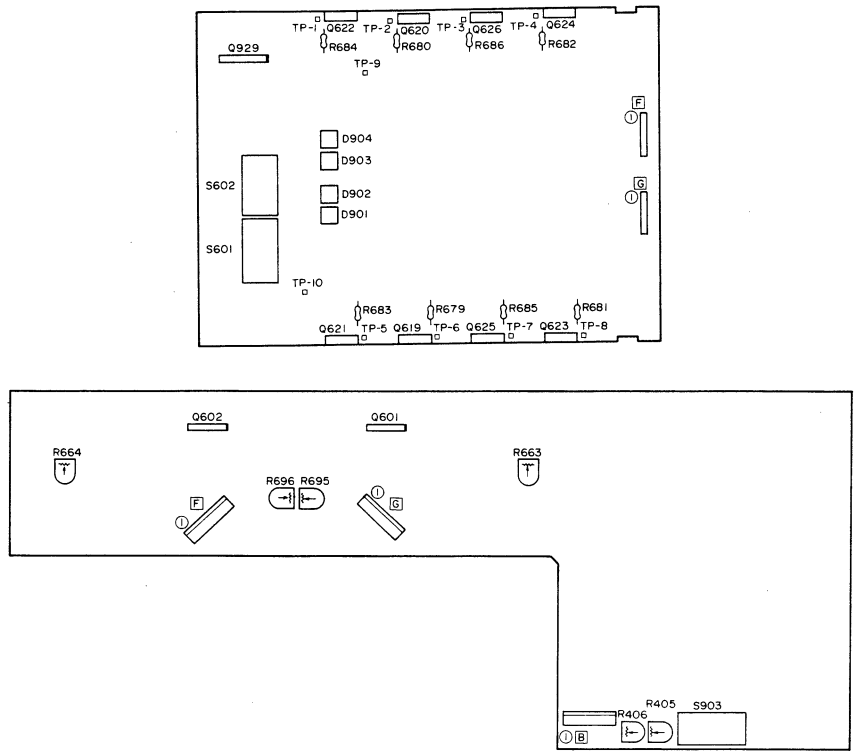

Figure 13

ALIGNMENT METHOD

1. Idle Current Alignment
   - L ch: After the elapse of one minute the power turned on, adjust R663 so that voltage reading of 22mV ±5.5mV is obtained across TP5 – TP10 (R683).
     In the similary way, make sure that the same voltage reading of 22mV ±5.5mV is developed across TP6 – TP10 (R679), TP7 – TP10 (R685) and TP8 – TP10 (R681).
   - R ch: After the elapse of one minute the power turned on, adjust R664 so that voltage reading of 22mV ±5.5mV is obtained across TP1 – TP9 (R684).
     In the similary way, make sure that the same voltage reading of 22mV ±5.5mV is developed across TP2 – TP9 (R680), TP3 – TP9 (R686) and TP4 – TP9 (R682).
2. Center Voltage Alignment
   - L ch: After the elapse of higher than 30 seconds the power turned on, adjust R695 until voltage reading of 0mV ±20mV is obtained between TP10 and ground.
   - R ch: After the elapse of higher than 30 seconds the power turned on, adjust R696 until voltage reading of 0mV ±20mV is obtained between TP9 and ground.
3. Meter Defection Alignment (Load 8Ω, both channel driven, in put 1V (2.2 dB))
   - L ch: Adjust R405 so that the meter indicates 0 dB when 100W (AC 28.3V) output is developed at speaker terminals.
   - R ch: Adjust R406 so that the meter indicates 0 dB when 100W (AC 28.3V) output is developed at speaker terminals.

CAUTIONS FOR OUTPUT CIRCUIT TROUBLESHOOTING

1. When replacing either one of Q619 or Q621, both should be replaced at the same time.
2. When replacing either one of Q620 or Q622, both should be replaced at the same time.
3. When replacing either one of Q623 or Q625, both should be replaced at the same time.
4. When replacing either one of Q624 or Q626, both should be replaced at the same time.

* 1. Transistors 2SK 405-Y used for above 1 and 2 have been prepared as a pair unit. (Part Code: 22 117 171)
2. Transistors 2SJ 115-Y used for above 3 and 4 have been prepared as a pair unit. (Part Code: 22 117 172)

5. ELECTRICAL PARTS LOCATIONS

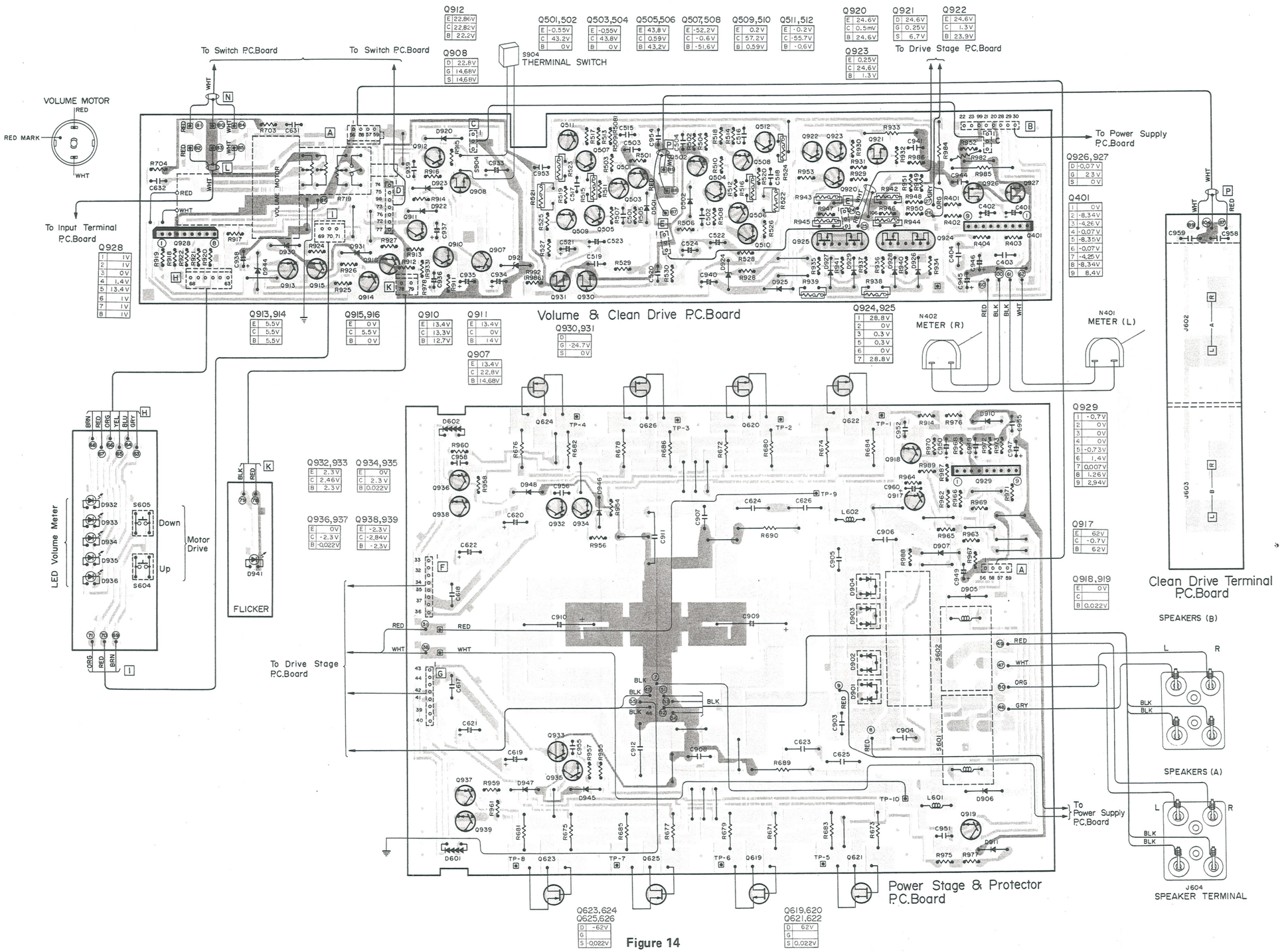

Figure 14

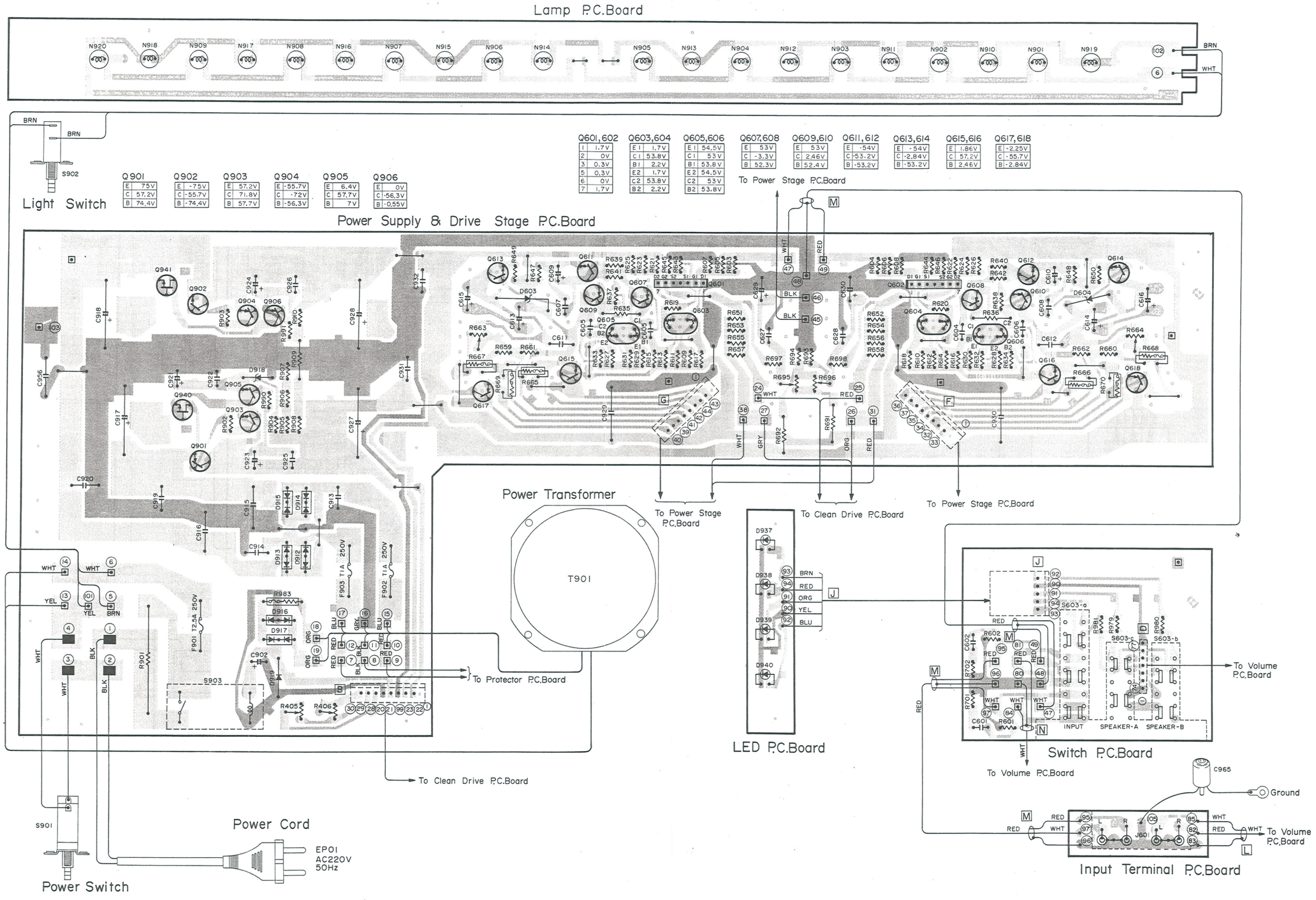
Lamp P.C.Board
N920 N918 N909 N917 N908 N916 N907 N915 N906 N914 N905 N913 N904 N912 N903 N911 N902 N910 N901 N919
102
6
BRN
WHT
BRN
BRN
S902
Light Switch
Q901 E 75V C 57.2V B 74.4V
Q902 E -75V C -55.7V B -74.4V
Q903 E 57.2V C 71.8V B 57.7V
Q904 E -55.7V C -72V B -56.3V
Q905 E 6.4V C 57.7V B 7V
Q906 E 0V C -56.3V B -0.55V
Q601,602 1 1.7V 2 0V 3 0.3V 5 0.3V 6 0V 7 1.7V
Q603,604 E1 1.7V C1 53.8V B1 2.2V E2 1.7V C2 53.8V B2 2.2V
Q605,606 E1 54.5V C1 53V B1 53.8V E2 54.5V C2 53V B2 53.8V
Q607,608 E 53V C -3.3V B 52.3V
Q609,610 E 53V C 2.46V B 52.4V
Q611,612 E -54V C -53.2V B -53.2V
Q613,614 E -54V C -2.84V B -53.2V
Q615,616 E 1.86V C 57.2V B 2.46V
Q617,618 E -2.25V C -55.7V B -2.84V
To Power Stage P.C.Board
Power Supply & Drive Stage P.C.Board
Q941 D -56.3V G -75V S -75V
Q940 D 75V G 57.7V S 57.7V
Power Transformer
T901
To Power Stage P.C.Board
To Clean Drive P.C.Board
To Power Stage P.C.Board
To Protector P.C.Board
To Clean Drive P.C.Board
LED P.C.Board
Switch P.C.Board
INPUT SPEAKER-A SPEAKER-B
To Volume P.C.Board
To Volume P.C.Board
Input Terminal P.C.Board
C965
Ground
J601
To Volume P.C.Board
S901
Power Switch
Power Cord
EP01
AC220V
50Hz

Figure 15

6. SCHEMATIC DIAGRAM

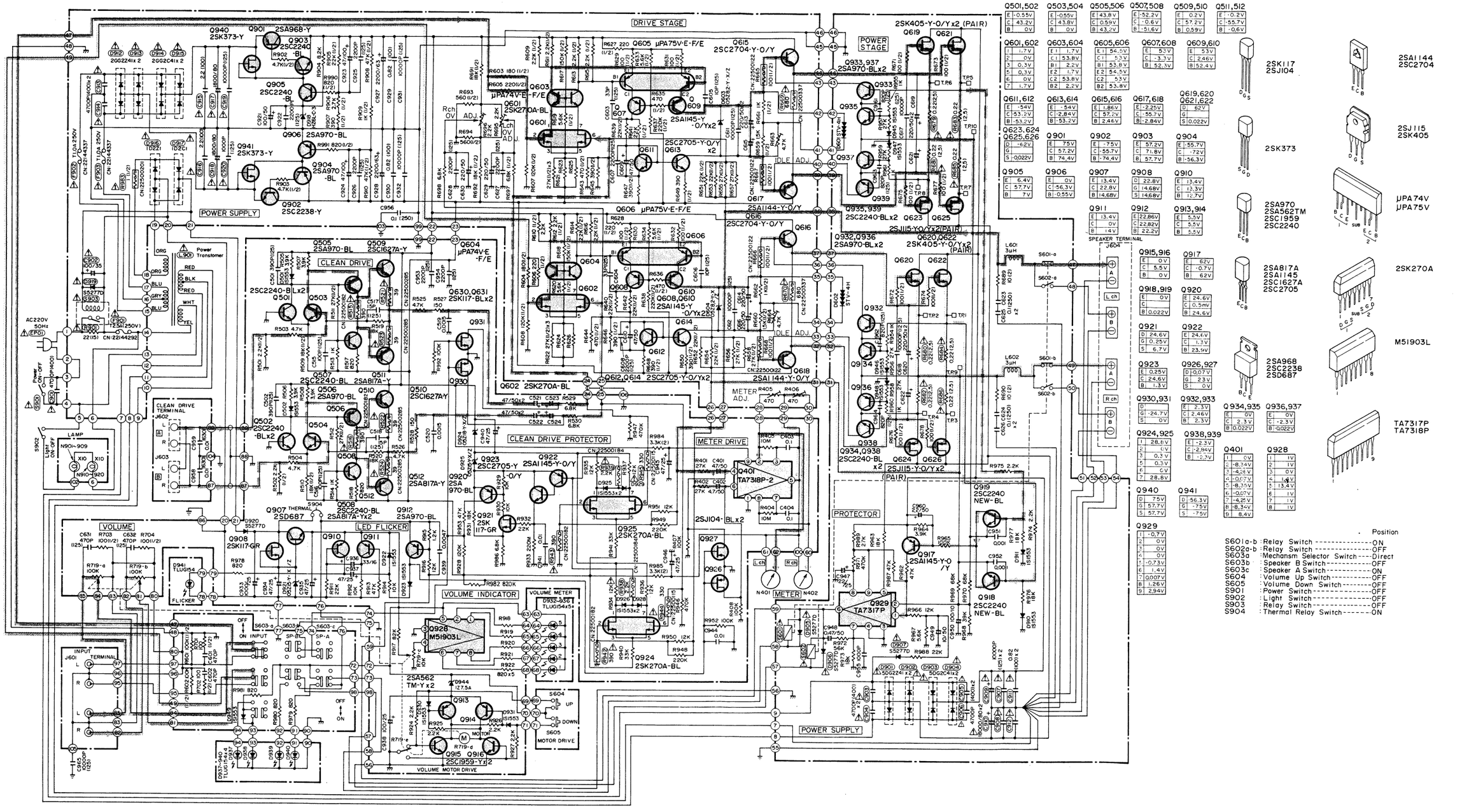

Figure 16

CAUTION:
The ⚠ mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replace only with types identical to those in the original circuit or specified in the parts list.

7. EXPLODED VIEW CABINET

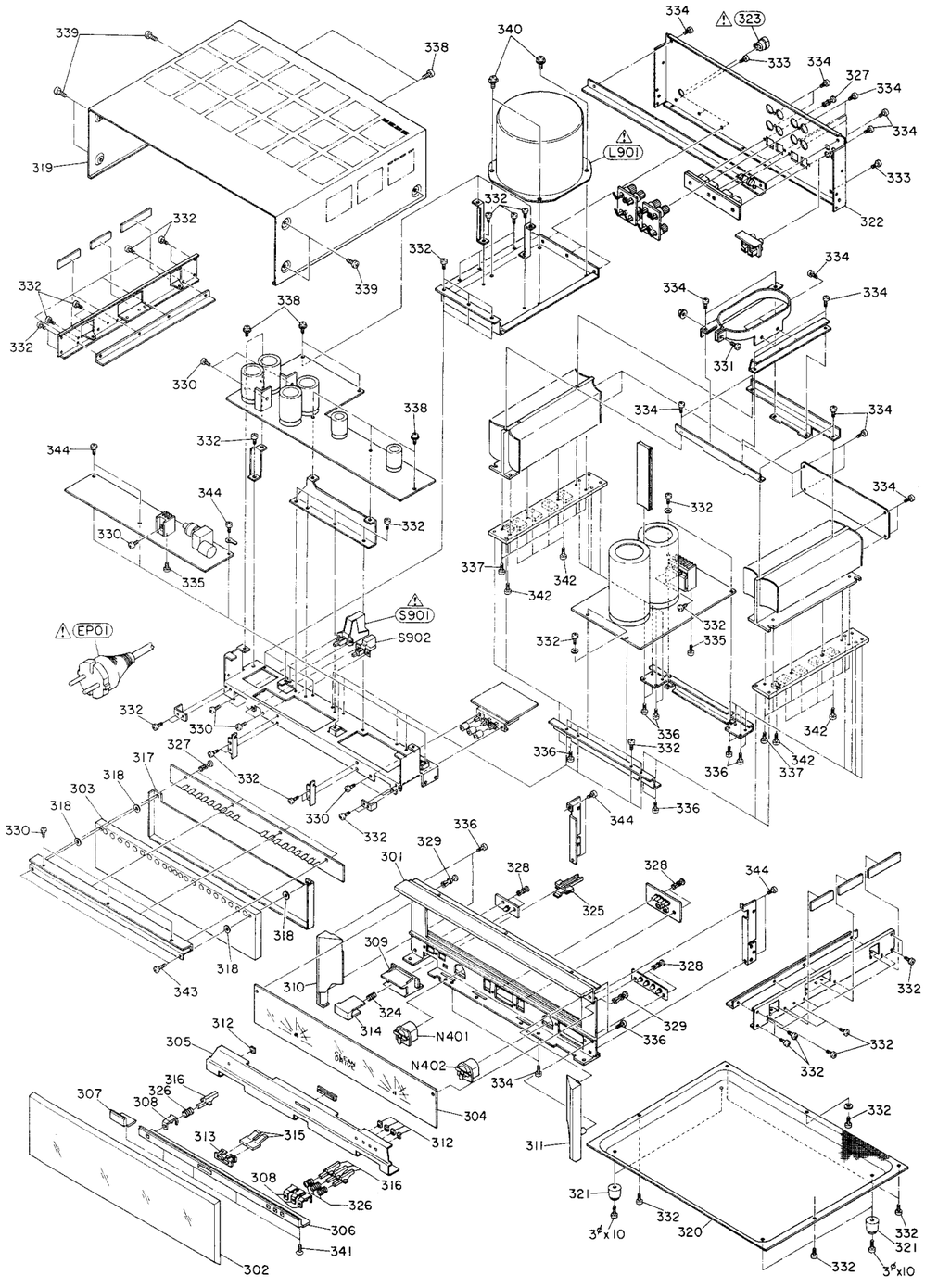

Figure 17

NOTE: Parts excluded in the parts list are not available as replacement parts.

8. CABINET PARTS LIST

CAUTION:
The ⚠ mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replace only with types identical to those in the original circuit or specified in the parts list.

Symbol No.	Part No.	Description
301	22844378	Front Panel
302	22830235	Front Glass
303	22837434	Lighting Plate
304	22837436	Meter Plate
305	22844340	Meter Decoration
306	22844406	Decoration Panel
307	22844401	Decoration Panel, Left
308	22883002	Holder, Knob
309	22883003	Holder, Power Knob
310	22883004	Side Decoration, Left
311	22883005	Side Decoration, Right
312	22883006	Lens
313	22883032	Holder, Up/Down Knob
314	22845407	Knob, Power
315	22884270	Knob, Up/Down
316	22884204	Knob, Light/Input/SP-A/ SP-B
317	22764086	Light Reflector
318	22753134	Spacer
319	22841335	Top Cover
320	22714217	Bottom Plate
321	22874041	Foot
322	22764155	Jack Plate
⚠ 323	25845528	Cord Bush
324	25779286	Spring, Knob
325	22883027	Holder, Power Knob
326	25779285	Spring, Knob
327	22705020	Plastic Rivet, 3ϕ x 4.5mm
328	22705022	Plastic Rivet, 3ϕ x 5.5mm
329	22705030	Plastic Rivet, 3ϕ x 8mm
330	22707066	Screw, 3ϕ x 6mm, BID
331	22707772	Screw, 4ϕ x 16mm, BID
332	22707910	Screw, 3ϕ x 6mm, BID Tapping
333	22707885	Screw, 3ϕ x 8mm, BID Tapping
334	22707911	Screw, 3ϕ x 8mm, BID Tapping
335	22707327	Screw, 3ϕ x 8mm, BID Tapping
336	22707826	Screw, 3ϕ x 10mm, BID Tapping
337	22707803	Screw, 3ϕ x 12mm, BID Tapping
338	22707798	Screw, 3ϕ x 10mm, TPAN
339	22707185	Screw, 4ϕ x 8mm, FTBID
340	22707196	Screw, 4ϕ x 8mm, FLFTPAN
341	22707051	Screw, 3ϕ x 6mm, FLT
342	22701325	Screw, 3ϕ x 8mm, BID
343	22707030	Screw, 3ϕ x 16mm, BID
344	22707842	Screw, 3ϕ x 8mm, BID Tapping

9. ELECTRICAL PARTS LIST

CAUTION:
The ⚠ mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replace only with types identical to those in the original circuit or specified in the parts list.

Symbol No.	Part No.	Description
TRANSISTORS, ICS & DIODES		
Q401	B0324880	IC, TA7318P-2
Q501, 502, 503, 504	A6325845	Transistor, 2SC2240NEW-BL
Q505, 506	A6533645	Transistor, 2SA970NEW-BL
Q507, 508	A6325845	Transistor, 2SC2240NEW-BL
Q509, 510	A6314470	Transistor, 2SC1627A-Y
Q511, 512	A6531170	Transistor, 2SA817A-Y
Q601, 602	A6046030	Transistor, 2SK270A-BL
Q603, 604	22114920	Transistor, μPA74V-E-F/E
Q605, 606	22114921	Transistor, μPA75V-E-F/E
Q607, 608, 609, 610	A6540520	Transistor, 2SA1145-Y-O/Y
Q611, 612, 613, 614	A6334820	Transistor, 2SC2705-Y-O/Y
Q615, 616	A6333690	Transistor, 2SC2704-Y-O/Y
Q617, 618	A6540420	Transistor, 2SA1144-Y-O/Y
Q619, 621	22117171	Transistor, 2SK405-O (Pair) Y
Q620, 622	22117171	Transistor, 2SK405-O (Pair) Y
Q623, 625	22117172	Transistor, 2SJ115-O (Pair) Y
Q624, 626	22117172	Transistor, 2SJ115-O (Pair) Y
Q901	A6533420	Transistor, 2SA968-Y
Q902	A6325620	Transistor, 2SC2238-Y
Q903, 905	A6325845	Transistor, 2SC2240NEW-BL
Q904, 906	A6533645	Transistor, 2SA970NEW-BL
Q907	A6844200	Transistor, 2SD687
Q908	A6041860	Transistor, 2SK117-GR
Q910, 911	A6531170	Transistor, 2SA817A-Y
Q912	A6533645	Transistor, 2SA970NEW-BL
Q913, 914	A6509140	Transistor, 2SA562TM-Y
Q915, 916	A6319300	Transistor, 2SC1959NEW-Y
Q917	A6540520	Transistor, 2SA1145-Y-O/Y
Q918, 919	A6325845	Transistor, 2SC2240NEW-BL
Q920	A6533645	Transistor, 2SA970NEW-BL
Q921	A6041860	Transistor, 2SK117-GR
Q922	A6540520	Transistor, 2SA1145-Y-O/Y
Q923	A6334820	Transistor, 2SC2705-Y-O/Y

Symbol No.	Part No.	Description
Q924, 925	A6046030	Transistor, 2SK270A-BL
Q926, 927	A6040105	Transistor, 2SJ104-BL
Q928	22114634	IC, M51903L
Q929	B0324800	IC, TA7317P
Q930, 931	A6041880	Transistor, 2SK117-BL
Q932, 933	A6533645	Transistor, 2SA970NEW-BL
Q934, 935	A6325845	Transistor, 2SC2240NEW-BL
Q936, 937	A6533645	Transistor, 2SA970NEW-BL
Q938, 939	A6325845	Transistor, 2SC2240NEW-BL
Q940, 941	A6059500	Transistor, 2SK373-Y
D501, 502	A7246601	Diode, 1S1553V
D601, 602	22115424	Diode, STV-4H
D603, 604	A7110208	Diode, 05Z8.2Y-X/Z
⚠ D901, 902	A7680430	Diode, 5DG2Z41
⚠ D903, 904	A7680420	Diode, 5DG2C41
⚠ D905, 906, 907	A7978389	Diode, S5277D, LC6
D910, 911	A7246601	Diode, 1S1553V
⚠ D912, 913	A7680050	Diode, 2GG2Z41
⚠ D914, 915	A7680040	Diode, 2GG2C41
⚠ D916	A7682061	Diode, 1D2Z1 (T)
⚠ D917	A7682021	Diode, 1D2C1 (T)
D918	22115676	Diode, HZ6L-C-3
⚠ D919, 920	A7978389	Diode, S5277D, LC6
D921	A7110509	Diode, 05Z15-Y-X/Z
D922, 923	A7246601	Diode, 1S1553V
D924	A7110611	Diode, 05Z18-Y-X/Z
D925	A7110509	Diode, 05Z15-Y-X/Z
D926, 927, 928, 929, 930, 931	A7246601	Diode, 1S1553V
D932, 933, 934, 935, 936, 937, 938, 939, 940, 941	A8690630	Diode, TLUG154
D944	A7270305	Diode, 1Z7.5A
D945, 946, 947, 948, 949	A7246601	Diode, 1S1553V

Symbol No.	Part No.	Description
	ELECTRICAL PARTS	
	L601, 602	22210171	Coil, Choke, 3 μH
⚠	L901	22224160	Transformer, Power
	N401, 402	22104574	Meter, Level
	N901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920	22113576	Lamp, 14V, 100mA
⚠	S601, 602	22148667	Relay, Protector
	S603-a,	22196119	Switch, Push, INPUT
	603-b,		Switch, Push, SPEAKER-B
	603-c		Switch, Push, SPEAKER-A
	S604	22195924	Switch, Key, VOLUME UP
	S605	22195924	Switch, Key, VOLUME DOWN
⚠	S901	22195957	Switch, Push, POWER
	S902	22196118	Switch, Push, LIGHT
⚠	S903	22148682	Relay, Power Muting
	S904	22196178	Switch, Thermal
	J601	22163885	Jack, US4P, Input
	J602, 603	22162476	Terminal, 2P, Clean Drive
	J604	22162512	Terminal, 4P, Speaker
⚠	F901	22144292	Fuse, T2.5A, 250V
⚠	F902, 903	22144337	Fuse, T1A, 250V
⚠	EP01	22176571	Power Cord
	EP02	22165047	Fuse Holder

Symbol No.	Part No.	Description
	CAPACITORS	
	J = ±5%, K = ±10%, M = ±20%	
	ABBREVIATIONS:	
	CD = Ceramic Disk, CS = Copper Leaf Stylene,	
	EL = Electrolytic, MPF = Metalized Polyester Film	
	C401, 402	22488479	EL, 4.7mfd, 50V
	C403, 404	22371104	MY, 0.1mfd, 50V, J
	C501, 502	22380205	CS, 390pF, 125V, K
	C515, 516	22380198	CS, 100pF, 125V, K
	C517, 518	22380188	CS, 15pF, 125V, K
	C519, 520	22371152	MY, 0.0015mfd, 50V, J
	C521, 522	22440411	EL, 47mfd, 50V
	C523, 524	22440411	EL, 47mfd, 50V
	C601, 602	22380206	CS, 470pF, 125V, K
	C603, 604	22380192	CS, 33pF, 125V, K
	C605, 606	22380186	CS, 10pF, 125V, K
	C607, 608	22380247	CS, 2200pF, 125V, K
	C609, 610	22440411	EL, 47mfd, 50V
	C611, 612	22380229	CS, 10000pF, 125V, K
	C613, 614	22440460	EL, 220mfd, 50V
	C615, 616	22440460	EL, 220mfd, 50V
	C617, 618	22380229	CS, 10000pF, 125V, K
	C619, 620	22440460	EL, 220mfd, 50V
	C621, 622	22440460	EL, 220mfd, 50V
	C623, 624	22370186	MPF, 0.1mfd, 250V, K
	C625, 626	22370186	MPF, 0.1mfd, 250V, K
	C627, 628	22380247	CS, 2200pF, 125V, K
	C629, 630	22440460	EL, 220mfd, 50V
	C631, 632	22380206	CS, 470pF, 125V, K
⚠	C901	22340150	CD, 4700pF, 400V, M
⚠	C902	22487101	EL, 100mfd, 35V
⚠	C903, 904	22380226	CS, 4700pF, 400V, K
⚠	C905, 906	22380226	CS, 4700pF, 400V, K
⚠	C907, 908	22380229	CS, 10000pF, 125V, K
⚠	C909, 910	22440525	EL, 18000mfd, 80V
⚠	C911, 912	22370306	MPF, 0.82mfd, 100V, K
⚠	C913, 914	22380226	CS, 4700pF, 400V, K
⚠	C915, 916	22370311	MPF, 2.2mfd, 100V, K
⚠	C917, 918	22440547	EL, 1800mfd, 80V
⚠	C919, 920	22380229	CS, 10000pF, 125V, K
	C921	22440376	EL, 100mfd, 50V
	C922	22380247	CS, 2200pF, 125V, K
	C923, 924	22440423	EL, 47mfd, 100V
	C925, 926	22380247	CS, 2200pF, 125V, K
	C927, 928	22440586	EL, 2200mfd, 63V
	C929, 930	22370306	MPF, 0.82mfd, 100V, K
	C931, 932	22380229	CS, 10000pF, 125V, K
⚠	C933	22487102	EL, 1000mfd, 25V

Symbol No.	Part No.	Description
C934, 935	22486470	EL, 47mfd, 25V
C936	22485330	EL, 33mfd, 16V
C937	22486470	EL, 47mfd, 25V
C938	22486101	EL, 100mfd, 25V
C939	22371472	MY, 0.0047mfd, 50V, J
C940	22486470	EL, 47mfd, 25V
C941	22372103	MY, 0.01mfd, 50V, K
C944	22372103	MY, 0.01mfd, 50V, K
C945, 946	22486470	EL, 47mfd, 25V
C947	22486220	EL, 22mfd, 25V
C948	22488478	EL, 0.47mfd, 50V
C949	22488100	EL, 10mfd, 50V
C950	22483101	EL, 100mfd, 10V
C951, 952	22371102	MY, 0.001mfd, 50V, J
C953, 954	22380247	CS, 2200pF, 125V, K
C955	22349102	CD, 1000pF, 50V, K
C956	22370186	MPF, 0.1mfd, 250V, K
C958, 959	22370181	MPF, 0.01mfd, 630V, K
C960	22488229	EL, 2.2mfd, 50V
C961, 962	22380209	CS, 820pF, 125V, K
C963, 964	22380209	CS, 820pF, 125V, K
C965	22380229	CS, 10000pF, 125V, K

RESISTORS

Resistors are carbon film 1/4W, ±5%, unless otherwise noted. 1K = 1000, 1M = 1000K

Symbol No.	Part No.	Description
R401, 402	22555273	27K ohm
R403, 404	22555106	10M ohm
R405, 406	22658260	470 ohm, Semi-fixed Variable
R407, 408	22555104	100K ohm
R501, 502	22550370	2.2K ohm, 1/2W
R503, 504	22555472	4.7K ohm
R505, 506	22555392	3.9K ohm
R507, 508	22555392	3.9K ohm
R509, 510	22550420	18K ohm, 1/2W
R511, 512	22550422	27K ohm, 1/2W
R513, 514	22555102	1K ohm
⚠ R515, 516	22500182	390 ohm, Fusible
R517, 518	22555821	820 ohm
R519, 520	22555183	18K ohm
⚠ R521, 522	22500178	39 ohm, Fusible
⚠ R523, 524	22500178	39 ohm, Fusible
R525, 526	22555472	4.7K ohm
R527, 528	22555151	150 ohm
R529, 530	22555682	6.8K ohm

Symbol No.	Part No.	Description
R601, 602	22550390	100K ohm, 1/2W
R603, 604	22550357	180 ohm, 1/2W
R605, 606	22550358	220 ohm, 1/2W
R607, 608	22550391	120K ohm, 1/2W
R609, 610	22550370	2.2K ohm, 1/2W
R611, 612	22550370	2.2K ohm, 1/2W
R613, 614	22550370	2.2K ohm, 1/2W
R615, 616	22550370	2.2K ohm, 1/2W
R617, 618	22550392	150K ohm, 1/2W
R619, 620	22550375	5.6K ohm, 1/2W
R621, 622	22550383	27K ohm, 1/2W
R623, 624	22550383	27K ohm, 1/2W
R625, 626	22550383	27K ohm, 1/2W
R627, 628	22550358	220 ohm, 1/2W
R629, 630	22550354	100 ohm, 1/2W
R631, 632	22550354	100 ohm, 1/2W
R633, 634	22550375	5.6K ohm, 1/2W
R635, 636	22540105	470 ohm, 1/2W
R637, 638	22550394	220K ohm, 1/2W
R639, 640	22550382	22K ohm, 1/2W
R641, 642	22550382	22K ohm, 1/2W
R643, 644	22550362	470 ohm, 1/2W
R645, 646	22550361	390 ohm, 1/2W
R647, 648	22550361	390 ohm, 1/2W
R649, 650	22550361	390 ohm, 1/2W
R651, 652	22550382	22K ohm, 1/2W
R653, 654	22550382	22K ohm, 1/2W
R655, 656	22550383	27K ohm, 1/2W
R657, 658	22550383	27K ohm, 1/2W
R659, 660	22550368	1.5K ohm, 1/2W
R661, 662	22550366	1K ohm, 1/2W
R663, 664	22658256	4.7K ohm, Semi-fixed Variable
⚠ R665, 666	22500122	100 ohm, Fusible
⚠ R667, 668	22500122	100 ohm, Fusible
⚠ R669, 670	22500337	680 ohm, Fusible
R671, 672	22540098	100 ohm, 1/2W
R673, 674	22540098	100 ohm, 1/2W
R675, 676	22540098	100 ohm, 1/2W
R677, 678	22540098	100 ohm, 1/2W
⚠ R679, 680	22500334	0.22 ohm, 2.5W, Wire Wound
⚠ R681, 682	22500334	0.22 ohm, 2.5W, Wire Wound
⚠ R683, 684	22500334	0.22 ohm, 2.5W, Wire Wound
⚠ R685, 686	22500334	0.22 ohm, 2.5W, Wire Wound
R689, 690	22540256	10 ohm, 2W
R691, 692	22540122	18K ohm, 1/2W
R693, 694	22550363	560 ohm, 1/2W
R695, 696	22658060	2.2K ohm, Semi-fixed Variable
R697, 698	22550376	6.8K ohm, 1/2W
R701, 702	22550354	100 ohm, 1/2W
R703, 704	22550354	100 ohm, 1/2W

Symbol No.	Part No.	Description
R719a-e	22620049	100K ohm, Variable, Volume, with Motor
⚠ R901	22500328	22 ohm, 15W, Wire Wound
R902, 903	22550374	4.7K ohm, 1/2W
R904	22550377	8.2K ohm, 1/2W
R905	22550382	22K ohm, 1/2W
R906	22550371	2.7K ohm, 1/2W
R907	22550361	390 ohm, 1/2W
R908	22550386	47K ohm, 1/2W
R909	22540109	1K ohm, 1/2W
R910	22550386	47K ohm, 1/2W
R911	22555223	22K ohm
R912	22555103	10K ohm
R913	22555473	47K ohm
R914	22555103	10K ohm
R915	22555122	1.2K ohm
R916	22555123	12K ohm
R917	22555823	82K ohm
R918, 919	22555821	820 ohm
R920, 921	22555821	820 ohm
R922	22555821	820 ohm
R924, 925	22555222	2.2K ohm
R926, 927	22555222	2.2K ohm
R928	22555124	120K ohm
R929, 930	22555103	10K ohm
R931	22555183	18K ohm
R932	22555223	22K ohm
R933	22540556	220M ohm
R934, 935	22555123	12K ohm
R936, 937	22555123	12K ohm
⚠ R938, 939	22500184	2.2K ohm, Fusible
R940, 941	22555333	33K ohm
⚠ R942, 943	22500182	390 ohm, Fusible
⚠ R944, 945	22500115	330 ohm, Fusible
R946, 947	22555474	470K ohm
R948, 949	22555224	220K ohm
R950, 951	22555123	12K ohm
R952	22555104	100K ohm
R953	22555473	47K ohm
R954, 955	22555102	1K ohm
R956, 957	22555273	27K ohm
R958, 959	22555273	27K ohm
R960, 961	22555102	1K ohm
R962	22555473	47K ohm
R963	22555183	18K ohm
R964	22555392	3.9K ohm
R965	22555104	100K ohm
R966	22555123	12K ohm
R967	22555562	5.6K ohm
R968	22555393	39K ohm
R969, 970	22555683	68K ohm
R971	22555474	470K ohm

Symbol No.	Part No.	Description
R972	22555563	56K ohm
R973	22555183	18K ohm
R974, 975	22555222	2.2K ohm
R976, 977	22555183	18K ohm
R978	22555821	820 ohm
R979, 980	22555821	820 ohm
R981	22555821	820 ohm
R982	22555824	820K ohm
⚠ R983	22500201	1 ohm, 1/2W, Fusible
R984, 985	22540367	3.3K ohm, 2W
R986	22555682	6.8K ohm
R987	22555473	47K ohm
R988	22555223	22K ohm
R989	22555273	27K ohm
R990, 991	22550365	820 ohm, 1/2W
R992	22555104	100K ohm

ACCESSORIES

AC01	22903438	Owner's Manual
AC02	22170431	Connector Cord
AC03	22170432	Connector Cord